

# **CARPETAMERICARECOVERYEFFORT**

Annual Report 2004



**CARE**

[www.carpetrecovery.org](http://www.carpetrecovery.org)

# **CARPETAMERICARECOVERYEFFORT**

*Developing market-based solutions for the recycling  
and reuse of post-consumer carpet*

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## Message from Frank Hurd, Board Chairman

CARE's third year has not been a spectacular year in terms of increasing the diversion of carpet from landfills but rather, a year where we have laid significant ground work for the future. We continue to learn every day and continue to appreciate how hard this task is. Several things contributed to a slow down in our growth; most importantly we are still feeling the after effects of the Polyamid 2000 closing which has led to lower than hoped for improvements in diversion of Post Consumer Carpet (PCC) from landfills. Most encouraging has been how the entrepreneurs reacted to this unexpected loss of business. They have been remarkable in rebuilding their businesses and are on the verge of real and dramatic growth.



We are seeing signs that this year will be much better than last year. Oil prices make post consumer carpet more attractive. As industry continues to find ways to reduce post industrial waste, less is available making PCC waste a necessity. We also took a look at our expectations for growth and realized we may have been overly optimistic with our expectation of dramatic growth early on. In the Market Development section of this report there is a discussion of a more realistic growth model that will still get us to our goals.

Our second annual meeting last year in Pensacola, FL was outstanding and I am looking forward to the third meeting being even better. Last year we gave out \$106,000 in grants to facilitate the work of entrepreneurs looking for ways to divert carpet from landfills. We will highlight a CARE Person of the Year and a Recycler of the Year. I can't say enough about this year's sponsors. They continue to make it possible for CARE to operate. The annual conference sponsors have been equally generous. A special thanks to all of them. This upcoming year we want to use our scarce resources to find ways to directly help entrepreneurs market their products. We want to find the best vehicles to engage state procurement officers in the CARE process. This is something we have not been very successful with thus far, but it is an area we feel will generate huge returns if we are successful. Again this is not a short term undertaking. Bob Peoples, our Executive Director, continues to be an outstanding addition to the CARE team. His efforts have been instrumental in moving CARE forward towards its goals. I would be remiss if I didn't make a special mention of Linda Harrington whose administrative skills have been invaluable to CARE. Also I would like to thank James Beach who has been a tremendous help in getting out the CARE newsletters.

As always, I can't thank my fellow board members enough for their tireless efforts. Without their dedication finding market-based solutions to land fill diversion of post consumer carpet would not be possible.

I am excited for the future. I think the foundation laid this, and previous years, will poise us for dramatic growth. I ask those who read this report to read it with this understanding. It is too early to judge if we are, or are not, making the kind of progress necessary to achieve our goals. (I think we are.) Many exciting things are taking place and once we see these activities start to mature, I think the growth of PCC landfill diversion will explode. I am looking forward to seeing where year four of CARE will take us.

A handwritten signature in blue ink, appearing to read "Frank K. Hurd".

Frank K. Hurd, Chairman, Board of Directors, CARE



## Message from Robert Peoples PhD, Executive Director

When I look back at the past three years, it is hard to believe how far we have come yet at the same time, recognize we have barely begun this journey. Like any young organization that struggles with financing and plays only a facilitation role, it has been a challenging year for CARE. However, we completed a major potential diversion analysis using an independent academic approach with Dr. Matthew Realf of Georgia Tech. A key observation out of this study was realization that landfill diversion of old carpet is set to follow a classic S Curve for growth. The practical implication of this analysis is an altered expectation that the early years will not follow the linear ramp up prescribed by the MOU signed on January 8, 2002. What is more important is making sure we do all we can to support, facilitate, communicate, and enable the growth of new products containing post-consumer carpet identified in the analysis. The bottom line is, we have no shortage of good ideas and many projects are already underway. This gives me cause for great excitement as a path forward is apparent. Please see the report for more details to get the full story.



Another observation that bears directly on our future chances of success is engagement. In recent months, several factors have aligned which favor success. Crude oil prices continue to climb and there is no expectation of a return to "normal" levels. In fact, the peak price for a barrel of oil has now been revised to \$107. Exports of post industrial and post consumer plastics continue to grow and prices continue to rise. The Asian continent cannot build basic petrochemical facilities fast enough to meet the growing demand for raw materials. This is driving a surge in demand for imported raw materials from the United States. This supply/demand situation will help us "get the economics right" when it comes to recycling. If the number of phone calls, emails and meetings is any indication of expanding and intense interest in the use of old carpet as a new feedstock, we are certainly on the right track. This "chatter" is up dramatically. I have spoken with many companies on a confidential basis that have strategic plans to ramp up recycling activity and use of post consumer carpet as a key raw material. As I said last year, I believe the key to success will be creating demand for products (both carpet and non-carpet) that contain post-consumer recycled content derived from carpet. Our project to engage the state and federal procurement processes is another step in creating that demand.

I would like to extend my personal thanks to all the entrepreneurs who are dedicated to business efforts in recycling of old carpet. Also, thanks to the CRI staff and especially to our Board of Directors. We are tackling tough challenges with a true spirit of cooperation that can only mean one thing – we will achieve our goal! I remain highly encouraged by the potential we command and anticipate exceeding our goals by 2012.

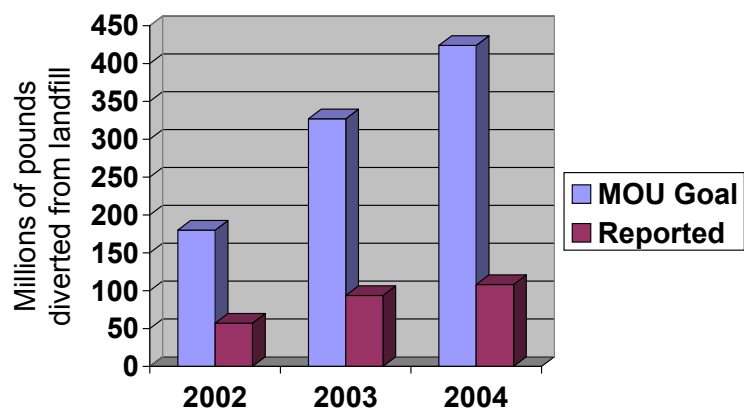
A handwritten signature in black ink, which appears to read "Robert Peoples". The signature is fluid and cursive.

Robert Peoples, Ph.D., Executive Director, CARE

## Executive Summary

In 2004 reported recycling of post-consumer carpet continued to increase, although at a slower pace than the increase from 2002 to 2003. A total of 108.2 million pounds of post-consumer carpet was reported to be diverted from landfills in 2004, with 98.4 million pounds being recycled. Compared to 2003, this represents a 15.5 percent increase in diversion and a 13.6 percent increase in recycling. As with 2003, this estimate of the level of carpet recycling is based upon data provided by a small percentage of the companies that are believed to be actually recycling carpet, meaning it is likely a significant underestimation of the level of carpet recycling. The progress in level of diversion from 2002 to 2004, along with the goals established in the Memorandum of Understanding (MOU) that established the Carpet America Recovery Effort are shown in the figure below. Response rate to the 2004 survey was only 7%, consistent with last year. Using another approach to model diversion pounds, it is estimated that undercounting may be as high as 60%. We also know 2004 was a year of recovery and rebuilding due to the 2003 shutdown of the Polyamid2000 facility in Germany.

An independent analysis of future diversion potential was completed in the fall of 2004. Many lessons have been learned in the past three years and it is now obvious that CARE will not achieve the linear ramp up defined in the original MOU. However, based on this independent analysis, lessons we have learned and from studying history, CARE has a very good chance of meeting or exceeding our goal by 2012.



## Detailed Report

### Diversion Progress versus MOU Goals

Data derived from the survey of companies that recycle post-consumer carpet was used to develop a detailed sense of the flow of materials from the point of generation to their ultimate disposition. This information should prove to be useful in improving the effectiveness of market development activities, as well as in targeting future data gathering. This is particularly important in light of the fact that gathering quantitative information from companies involved in carpet recycling continues to be a challenge, despite all attempts to ensure confidentiality and to make the effort required to respond to the survey as minimal as possible.

Market development continues to be a significant challenge for the carpet recycling industry. Several companies that participated in the 2004 survey indicated that market development should be a priority for

CARE. The survey of federal and state agencies revealed that there was relatively little activity in these agencies focused on carpet recycling in general, although there was some limited grant activity reported.

## Evaluation of Progress Toward National Goals for Carpet Recovery

The MOU that established the CARE initiative included an escalating target for diversion of post-consumer carpet from landfill, with the ultimate goal of diverting 40 percent of the post-consumer carpet generated. In addition, the MOU included estimates of the different types of diversion that might be employed to achieve the overall goal of 40 percent. When this information is coupled with projections of the amount of used carpet that will be discarded, it results in specific quantitative targets for diversion of post-consumer carpet. These are shown in Table 1 on a weight and percentage basis, respectively.

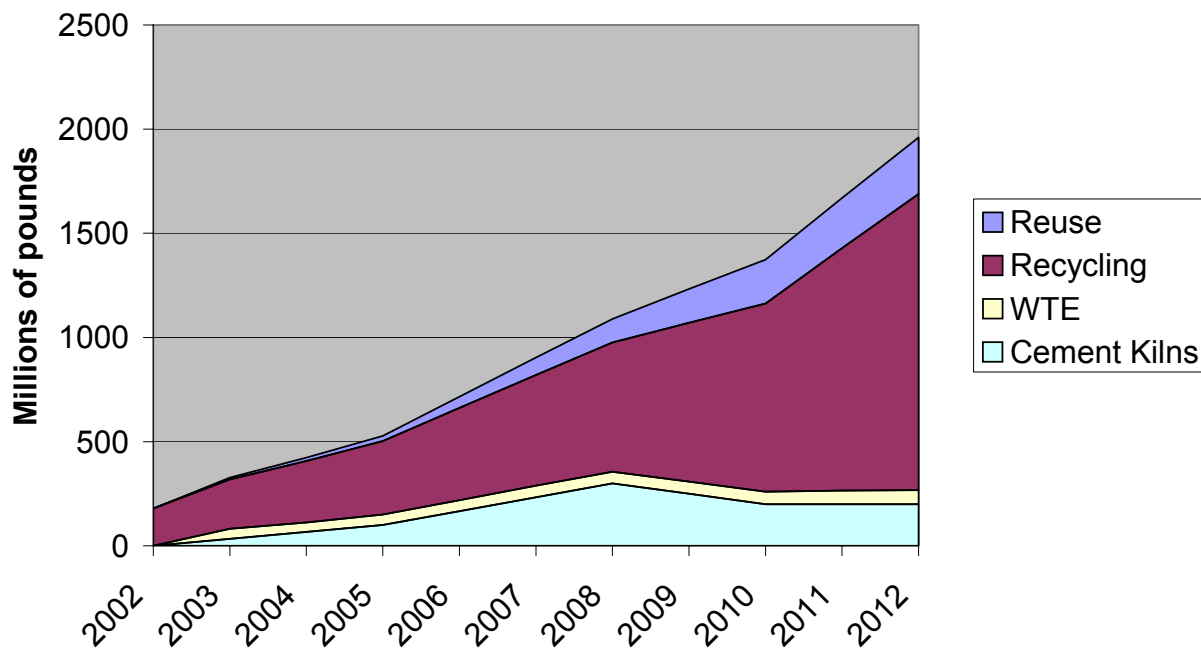
**Table 1: MOU Goals for Post-Consumer Carpet Recovery**

(Data expressed in millions of pounds)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total Discards	4,678	4,828	4,537	5,038	5,261	5,590	5,642	5,887	6,020	6,605	6,772
Reuse				25			113		211		203-339
Recycling	180			180			620		903		1,354-1,693
Waste-to-Energy		48	45	50	53	56	56	59	60	66	68
Cement Kilns				100			300		200		200
Landfill	4,498			4,510			4,552		4,646		4,812
Recycling Rate	3.8%			7%			11%		15%		20 – 25%
Landfill Diversion Rate	3.8%			10%			19%		23%		27 – 34%

The diversion goals contained within the MOU are also shown graphically in Figure 1.

- 1 Estimates of carpet discards provided by The Carpet and Rug Institute and incorporated into the MOU.
- 2 The percentage goals in the MOUS do not add up to 40% and are expressed as a range to allow flexibility in achieving and potentially exceeding the 40% diversion goal.

**Figure 1: MOU Diversion Goals**

Note: WTE = Waste to Energy

To update the progress towards meeting those goals as reported in the CARE Annual Report 2003, an independent survey process and analysis was conducted by Weston Solutions, Inc. (WESTON) to assess the current status of diversion of post-consumer carpet from landfills. The results of that surveying process, as well as a description of the survey methodology, are contained in the remainder of this section of the Annual Report.

It should also be noted that the MOU includes goals for government agencies to participate in and promote market development activities for post-consumer carpet, and it is important that this Annual Report include an update on the status of those activities. Therefore, WESTON conducted a separate survey of state and federal agencies, and the results of that analysis are discussed later in this Report.

### Key Quantitative Results from the Carpet Recovery Survey

In reviewing the results from the survey of carpet recycling, it is important to put them into context, both in terms of results from previous years and the overall goals established in the MOU. Therefore, in this discussion of survey results, basic recycling and diversion data will be presented and compared with results from 2002 and 2003 and the goals of the MOU. Then, more detailed analysis of the 2004 survey results will be presented.

Table 2 shows a comparison of the quantity of post-consumer carpet recycled and diverted from landfill in 2002 through 2004, on a weight and percentage basis.

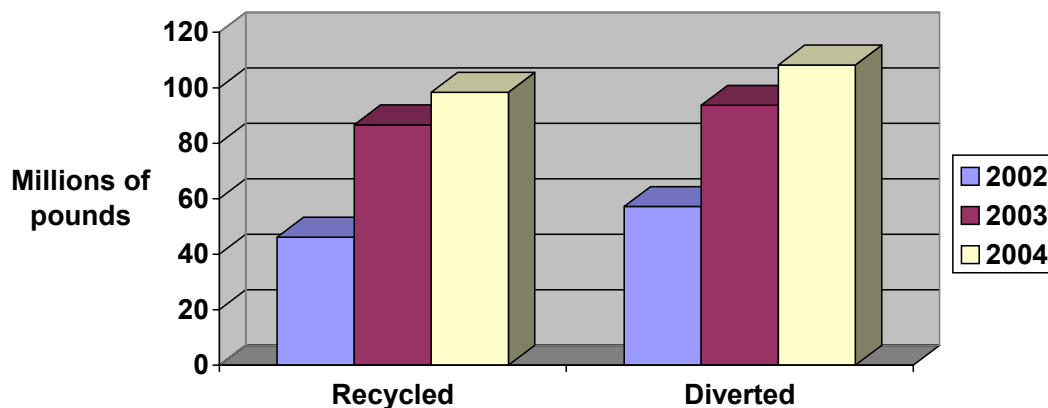
**Table 2**  
**Post-Consumer Carpet Recycling and Diversion, 2002 - 2004**

	Millions of Pounds			Percent of Total Discards		
	2002	2003	2004	2002	2003	2004
Total Discards	4,678	4,828	4,537	-	-	-
Recycled	46.2	86.6	98.4	0.99%	1.79%	2.17%
Diverted	57.2	93.7	108.2	1.22%	1.94%	2.38 %

It should be noted that in this report, material recycled is considered all material recovered and recycled by being remanufactured into the same or different products or by being used as a feedstock in a manufacturing process. Material diverted is all material diverted from landfill, including all recycled material, as well material sent to waste-to-energy facilities or cement kilns.

The data in Table 2 show that the quantity of post-consumer carpet reported to be recycled increased from 86.6 to 98.4 million pounds from 2003 to 2004, an increase of 13.6 percent, and total diversion from landfill increased from 93.7 to 108.2 million pounds, an increase of 15.5 percent. When compared with 2002, recycling has increased 130 percent and diversion has increased by 89 percent. These increases can be seen graphically in Figure 2.

**Figure 2**  
**Post-Consumer Carpet Recycling and Diversion, 2002 - 2004**



In looking at the comparison between these different years of data, it is important to recognize that these are comparisons of results from survey processes, and therefore it is difficult to assess how much of the increase is a result of actual increases in recycling and diversion versus an increase in the effectiveness of the survey process. This is particularly true since the surveys conducted are believed to capture only a fraction of the actual carpet recycling and diversion occurring in the field (see later sections of this Report for an assessment of the survey process). Nonetheless, these results show increases in the amount of material reported to be diverted from landfill and recycled from 2002 to 2004. By using an alternative mass-balance approach to calculate diversion rate, it is estimated that undercounting could reach as high as 60 percent.

It is also important to review the results in the context of the goals established in the MOU. Since specific recycling and diversion rate targets for each year were not explicitly established within the MOU, it is necessary to interpolate between the 2002 and 2005 targets. The result in a recycling rate target of 5.9 percent for 2004 and a total diversion target of 7.9 percent for 2004. When applied to the 4,537 million pounds of carpet projected to be discarded in 2004, these targets can be converted to 267 million pounds recycled and 358 million pounds diverted. Table 3 compares these targets with the results from the carpet recovery survey, and also includes 2002 and 2003 data for additional comparisons.

**Table 3**  
**Comparison of Post-Consumer Recycling and Diversion with MOU Goals**

(All data except percentages expressed in millions of pounds)

	2002			2003			2004		
	Reported	Goal	Difference	Reported	Goal	Difference	Reported	Goal	Difference
Total Discards	4,678			4,828			4,537		
Qty. Recycled	46.2	178	-132	86.6	235	-148	98.4	267	-169
% Recycled	1.0%	3.8%	2.8%	1.8%	4.9%	-3.1%	2.2%	5.9%	-3.7%
Qty. Diverted	57.2	178	-121	93.7	283	-189	108.2	358	-250
% Diverted	1.2%	3.8%	-2.6%	1.9%	5.9%	-4.0%	2.4%	7.9%	-5.5%

The data in Table 3 show that despite the fact that the level of recycling and diversion reported has increased significantly from 2002 to 2004, the projected increases in discards of used carpet and the percentage goals for diversion and recycling established in the MOU outstrip the increase in reported diversion and recycling. The projected increase in discards and the increasing percentage goals for diversion and recycling mean that the "bar" to reach the MOU goals is set higher each year, and the reported increases in recycling and diversion were insufficient to meet the higher bar. Thus, despite the reported increases in recycling and diversion, the gap between the MOU goals and reported performance continues to grow. See Product and Market Development section for an alternative view of the path forward and progress actually being made.

These results, however, must be considered within the context of the overall response rate for the survey. For each year from 2002 to 2004, the response rate for the survey used to establish these figures was so low, that it is likely that actual recycling rates are significantly higher than documented herein. Since only approximately 7 percent of the companies surveyed responded each year, it is reasonable to assume that there is a substantial amount of carpet recycling that has gone undocumented. For the 2004 data, we know that there is at least some level of additional recycling that is undocumented, since some of the companies contacted acknowledged their involvement in recycling of post-consumer carpet, but were unable or unwilling to provide quantitative estimates of material recycled. When this information is combined with the low response rate, it is reasonable to state that significant quantities of carpet recycling continue to go undocumented. Estimated undercounting could be as high as 60 percent.

With those basic comparisons complete, the results of the 2004 survey can be examined in greater detail. Table 4 presents the 2004 survey results, showing the breakdown by type of diversion from landfill.

**Table 4**  
**Breakdown of 2004 Diversion of Post-Consumer Carpet**

(Figures may not add up due to rounding)

	Millions of pounds	As % of Total Diversion	As % of Total Discards
Reuse	0.3	0.3%	0.0%
Recycling	98.4	90.9%	2.2%
Waste-to-Energy	8.6	8.0%	0.2%
Cement Kilns	0.9	0.8%	0.0%
<b>TOTAL DIVERSION</b>	<b>108.2</b>	<b>100%</b>	<b>2.4%</b>

The data in Table 4 show that for 2004, all of the quantitative results for diversion came primarily from two types of activities: recycling and waste-to-energy, with the vast majority of the diversion occurring through recycling. In 2004 there were small amounts of diversion reported through reuse and cement kilns – while these quantities are not significant, it is important to note that we had no diversion reported through these methods in 2003.

Another type of data gathered during the surveying process was information regarding the flow of used carpet through different types of companies. This information can help future market development efforts, and as a result, the surveying process was designed to extract as much information as possible regarding the flow of material through different types of entities. To accomplish this goal, survey respondents were asked to characterize the nature of their business into one or more of the following categories:

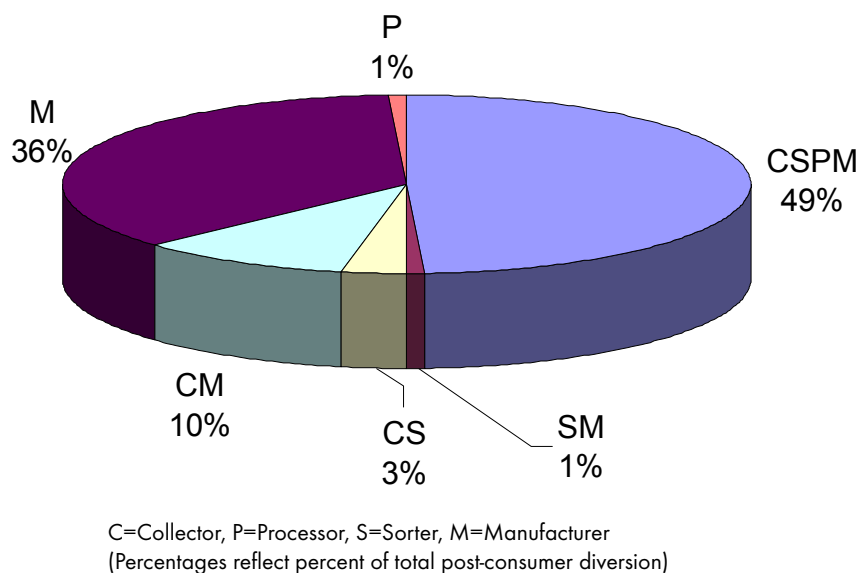


- Collector – A company that collects used carpet from the point of generation and transports it to a processing or waste management facility.
- Sorting Facility – A facility that separates waste materials (including used carpet) from a mixed waste stream. The end result of this process is used carpet that is separated from other materials.
- Processor – A company or facility that takes used carpet (whether handled by a sorting facility or brought directly by a collector) and processes it for use as a feedstock in a manufacturing facility.
- Manufacturer – A company or facility that utilizes processed carpet materials and transforms them into other products, or uses them as raw materials in a manufacturing process.

Since material tends to aggregate into fewer, larger facilities as it proceeds from collection through manufacturing, a conscious effort was made to focus the surveying effort on manufacturers – each manufacturer responding to the survey is likely to account for a larger fraction of the total material recycled than each collector, sorting facility, or processor (see later sections of this Report for a description of the survey methodology). Thus, it is not surprising that 92 percent of the diversion determined through this surveying process came from companies that include “manufacturer” in their description of the functions their company provides related to carpet recycling.

While the high percentage of diversion attributed to companies that include manufacturing as part of their functions is similar to 2003, there was greater diversity in the overall range of types of companies reporting in 2004. Companies reported a number of different combinations of services in defining their role in carpet recycling, and there were also companies that were dedicated to a single function, which is different than the results from 2003. The breakdown of diversion by different types of companies is shown in Figure 3.

**Figure 3**  
**Types of Companies Contributing to Post-Consumer Diversion**



It can be seen from Figure 3 that the vast majority of diversion was performed by two categories of company types: those that perform collection, sorting, processing and manufacturing and those that just perform manufacturing. Companies that perform collection and manufacturing are the next largest contributor to diversion. The other types of companies (including some that are so minor they do not even show up on the graph) contributed, in total, only five percent of total diversion. This reinforces the fact that companies that perform manufacturing as one of their functions continue to dominate post-consumer carpet diversion.

Another component of the surveying process that was geared towards increasing an understanding of the flow of recycled material was to ask survey respondents the type of companies to which they pass used carpet material after they are done with it. Survey respondents were asked what percentage of the post-consumer used carpet they handle is passed on to sorting facilities, processors, manufacturers, waste-to-energy facilities or landfills. The results from this portion of the survey are summarized in Table 5 and shown graphically in Figure 4

**Table 5**

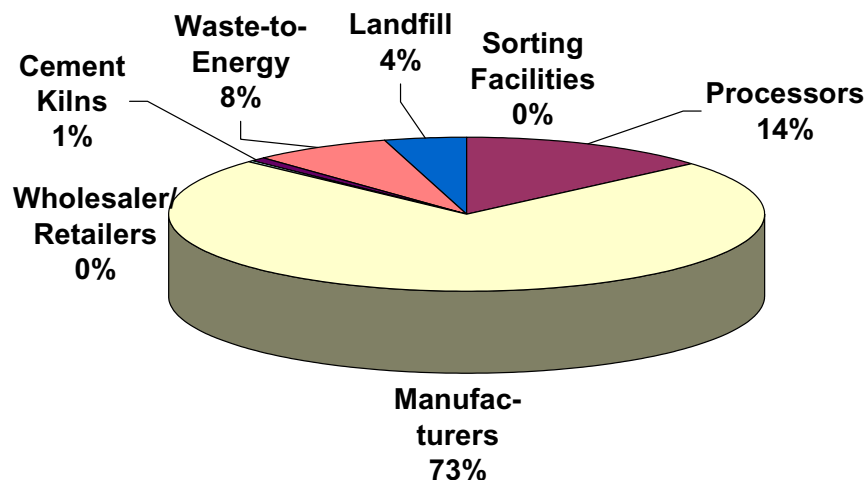
**Destination of Post-Consumer Carpet Handled by 2004 Survey Respondents**

(Totals may not agree due to rounding)

	Sorting Facilities	Processors	Manu-facturers	Whole-saler/Retailer	Cement Kilns	Waste-to-Energy	Land-Fill	TOTALS
Millions of Pounds	0.0	15.4	83.0	0.3	0.9	8.6	5.0	113.2
Percent of Total Handled	0%	14%	73%	0.3	1%	8%	4%	100.0%

**Figure 4**

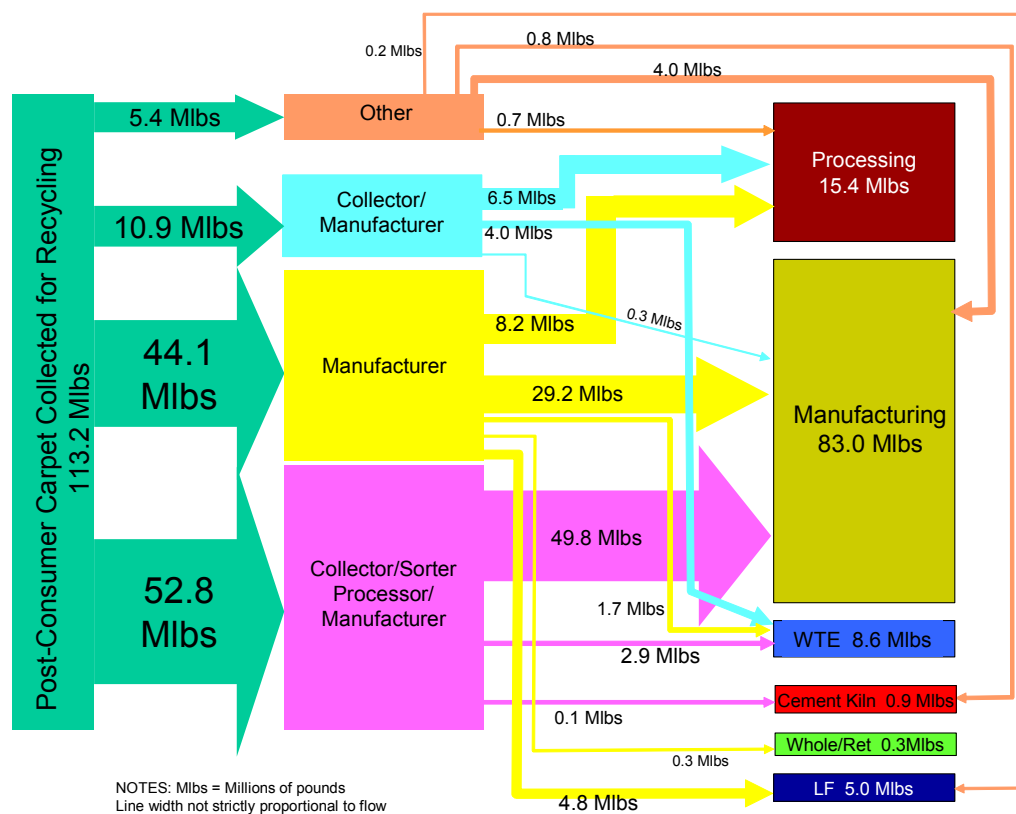
**Destination of Post-Consumer Carpet Handled by 2004 Survey Respondents**



It can be seen that roughly three-quarters of the material handled by survey respondents was sent to manufacturers. This is consistent with the fact that virtually all of the respondents characterized themselves as including manufacturing capabilities, and most of those types of facilities send their end-products to another manufacturer for use as a feedstock. This also explains the relatively low percentages sent to waste-to-energy and landfill, since most of these types of facilities would only send material that they could not process to waste-to-energy or landfill.

With the information described above regarding the types of companies that handle post-consumer carpet for recycling and the types of companies that they pass that material on to, a flow of carpet recycling can be developed. While the relatively low response rate for the survey prevents one from characterizing this flow as being completely representative of the overall carpet recycling industry, it does provide an interesting insight into how post-consumer carpet gets recycled, at least for the companies that participated in the survey. This flow is illustrated in Figure 5

**Figure 5**  
**Flow of Post-Consumer Carpet Recovery Reported in 2004**



While the flows in this diagram can appear quite complex, a great deal of information can be derived from review of this diagram. First, it is possible to see the split of "inputs" into the recycling process into the three categories of companies that reported recycling post-consumer carpet. Second, one can get a sense of the split of the ultimate disposition of material at the end of the recycling process (at least the end as far as this surveying project goes). In addition, the diagram is useful in showing what types of companies send material to different types of end-users.

## Qualitative Feedback from Carpet Recovery Survey

In addition to the quantitative data gathering that was performed during surveying, survey respondents were also asked what they thought CARE could be doing to assist their business in recycling carpet. Responses ranged from very general to very specific, and were not always directly related to the question of how CARE could provide additional assistance. Nonetheless, the responses provide useful insight into the current status of thinking of companies active in carpet recycling. Some of the most relevant comments are summarized below:

- One company suggested that CARE provide grants to promote emerging markets for used carpet.
- There were a number of comments that related to the general topic of CARE's support for market development.
- One company suggested that CARE promote education to ensure that everyone knows about carpet recycling.
- There were two comments related to CARE's promotion of end-users to purchase products with post-consumer content, including the suggestion that CARE work with federal and state government to create a preferred purchasing requirement for carpet with recycled content.

## Survey Methodology

In developing a survey methodology to establish quantitative estimates of recycling of a particular waste-stream, two key factors must be taken into account: 1) participation; and 2) double-counting. Participation is essential in any surveying process, but more so for this type of survey, where there is no logical or reliable way to extrapolate results from respondents to the general population. This means that whatever results are derived from the respondents to the survey are the complete and total results. Thus, every effort must be made to maximize participation.

However, with increasing participation comes another potential problem: double-counting. Since a given pound of used carpet may pass through several different entities on its way from the point of generation to its ultimate disposition (reuse, recycling or disposal), and since all of these different types of entities (collectors, sorting facilities, processors and manufacturers) are all included in the survey, there is the chance that the same pound of carpet could be counted more than once. As participation increases, the likelihood of double-counting increases, since there is a greater chance that more than one company may be reporting on handling the same material.

A number of features were built into the surveying process to address these two key issues:

- Confidentiality of data is often the key to participation, and all aspects of the survey were designed to preserve confidentiality. In particular, a web-based surveying tool was used to allow respondents to provide data completely anonymously, if they desired. There is no need to e-mail the survey back, so if no contact information is provided, the results cannot be traced back to a particular source. In addition, all written and verbal communication with potential survey respondents stressed the confidentiality of data.

- Simplicity and ease of response is also a key to participation rates. The survey questions were streamlined to the maximum extent possible so that only the most critical data requirements were included, based upon the philosophy that it is much better to have the basic data from a lot of respondents than detailed information on a few (particularly since there is no basis for extrapolation).
- An incentive can often help to boost participation rates, so the survey was distributed with an offer that the first 50 participants would receive \$20 gift certificates. While it is difficult to assess if this had an impact on participation rates, we do believe it contributed to respondents providing contact information in their web-based responses.
- Participation rates can also be boosted through the use of multiple means of contact (as well as repeated contacts). Thus, e-mail, regular mail and telephone were all used as means to contact potential survey respondents.
- To maximize the value of those survey responses received, and to minimize chances of double-counting, it was determined that it would be best to focus surveying resources on large-scale manufacturers that recycle used carpet. While all types and sizes of companies involved in carpet recycling were contacted initially with a request to respond to the survey, resources for telephone follow-up were prioritized to focus more heavily on those entities judged to be large-scale manufacturers handling used carpet. Since most recyclables tend to aggregate as they go through various stages of the recycling process (going from a large number of collectors, to a smaller number of sorting facilities, to a smaller number of processor and finally to a smaller number of manufacturers), one can get more “bang for the buck” in devoting resources to gathering data from a manufacturer than from other types of companies.
- To reduce the chances of double-counting, survey respondents were asked to identify the geographic sources of their materials; to the extent they were known. The notion behind this is that if the nature of the survey responses is such that there is a sense that information from two or more companies might reflect handling of the same material, the geographic sources of these companies could be reviewed to determine if that was likely.
- In another attempt to reduce the chances for double-counting, survey respondents were asked about the type of companies that receive the material that their company ships out after they are done handling it. This information not only allows for identification of possible double-counting, but also serves to provide a more complete picture of the overall flow of used carpet through the collection and recycling process.

With those basic principles in mind, the surveying process was implemented, using the steps outlined below, which are described in generally chronological order:

1. The survey form used in the 2003 survey was updated to reflect the need to recover data for 2004. The survey form is shown in Appendix 1 to this Report.
2. The survey form was converted to a web-based survey and posted on the internet. The survey is accessed by going to a specific URL address that houses the survey, and results are submitted via the internet, without the need for e-mail or paper-based responses. The results are only available to WESTON, as they are password protected, to preserve confidentiality.
3. Using lists of companies involved in carpet recycling provided by CARE, those companies for which a specific e-mail address was known were notified via e-mail about the survey and provided the URL so that they could respond electronically. A total of 59 individuals from 54 different companies were sent

e-mail notifications of the survey (more than one individual was contacted from an individual firm in several instances). The e-mail notification stressed the confidentiality of the information they provide, as well as the opportunity to receive a gift certificate as a "thank you" for their response.

4. All companies within the lists provided by CARE (including those with and without e-mail addresses) were notified of the survey via regular mail. The same basic information contained in the e-mail was transmitted via regular mail. Mail notifications were sent to approximately 370 separate addresses, which represent 318 distinct companies (many companies had multiple addresses and/or contacts). The companies that were included in the survey are listed in Appendix 1.
5. Approximately 10 days after the e-mail notifications were sent out, a second e-mail was sent out to those companies that had not responded, reminding them of the opportunity to receive a gift certificate in exchange for their response.
6. Approximately 10 days after the mail notifications were sent out, telephone follow-up was initiated. This telephone follow-up used the prioritization scheme described earlier, where those companies that were believed to be relatively large-scale manufacturers handling used carpet were targeted first for follow-up. When contact was made via telephone, the survey questions were asked and answered verbally, although in several cases, participants decided to enter their information through the electronic survey after being contacted by telephone.
7. All survey responses, whether by telephone or electronically over the internet, were entered into a spreadsheet-based database. This database contains all of the quantitative responses, as well as summaries of any descriptive information provided by the companies.
8. The data in the database was compiled and analyzed to produce the results described herein. Follow-up calls or e-mails were used to clarify responses that were unclear. Data was reviewed to ensure that it was internally consistent (for instance, to determine that the percentages of material sent to different types of companies added up to 100 percent) and that there were no anomalies (data off by one or two orders of magnitude from what would be expected based upon knowledge of the type and size of company).

There were two unique aspects of the survey implementation in 2004. The first is that in a few instances, information was provided through intermediaries and not by the companies themselves. This was done only in those instances in which the intermediary was known to be a reliable source of information and in which the rationale for using the intermediary was known. The two reasons for using intermediaries were to help compile data on behalf of a company or to provide an even higher level of confidentiality than was offered through this survey methodology.

The second unique aspect of the data collection in 2004 was that the data from one company had to be adjusted to avoid double-counting. As indicated previously, the low participation rate diminishes the chance of double-counting, so it has not generally been an issue of significant concern. However, with regards to data from one company, it was known that some of the material received by that company came from other companies who had responded to the survey. Thus, if we were to count all of the recycling performed by this company and well as that from the other companies providing material to that company, we would be double-counting at least some material.

It was also known that some sources of material for the company in question were outside of those that had responded to the survey. This meant that if we did not count any of the material recycled by this company we would be knowingly underestimating the level of recycling. Ideally, the percentage split between how much

had already been counted versus not would be determined, but there was no way to do that without violating confidentiality of data. As a result, it was determined that 50 percent of the recycling reported by this company would be included in the totals for 2004. This represents a compromise between knowingly double-counting if 100 percent of this company's recycling was included and knowingly under-counting if none of this company's recycling was included.

### Assessment of Survey Approach and Results

As with the survey performed in 2004 (to gather 2003 data), low participation rate continues to be a problem in gathering data about the status of carpet recycling: 20 firms, or approximately 6 percent of all the firms targeted in the survey responded, a slightly lower percentage than last year. However, it should be noted that the philosophy of focusing on larger manufacturers in the data-gathering process did seem to pay off in that a higher quantity of recycling was identified for 2004 than for 2003, even though the response rate was slightly lower – and based upon the anecdotal evidence gathered during surveying this appears to be more the result of targeting bigger companies than a significant increase in recycling by survey respondents in the period from 2003 to 2004.

In addition, it is important to note that it took a great deal of effort to get even the low response rate achieved for the survey. About half of the survey responses came about through response to sending an e-mail regarding the electronic survey. The rest of the results required significant follow-up via telephone to extract the desired information, or to remind the person to fill out the electronic survey. Much of that effort, however, is caused by having relatively few e-mail addresses and even fewer up-to-date e-mail addresses. Thus, an area to focus on in future surveying efforts is to gather more e-mail contacts for companies involved in carpet recycling.

The combination of low response rate and focusing on larger manufacturers resulted in very low chances for double-counting. However, as noted above, there was one company's response that had to be adjusted to reduce double-counting. If response rates improve in future years, this may prove to be a more significant issue, and require even greater focus on manufacturers and exclusion of data from collectors, sorting facilities and processors to avoid the risk of double-counting.

### Results from Survey of State and Federal Agencies

As was done for 2002 and 2003, the U.S. Environmental Protection Agency (EPA) and state environmental regulatory agencies were surveyed regarding their efforts to promote carpet recycling. A separate web-based survey tool was created for these agencies, which were contacted via e-mail (more than once in most instances), and via telephone follow-up for those agencies that did not respond. Of the 11 EPA offices contacted, two responded, and of the 50 state agencies, three responded. Based upon the results from those that did respond, and feedback received through follow-up calling, it appears that lack of funding has resulted in a relatively low level of activity in this arena, and as a result, many of the agencies contacted likely felt that they had nothing to report, and so did not respond.



The specific questions posed to these agencies, and a summary of their responses is provided below.

***What efforts were made in 2004 to publicize carpet collection/recycling options (e.g. web-sites, pamphlets, press releases, etc.)?***

- One EPA region indicated that they did not perform any activities to promote carpet recycling and one EPA region indicated it did so through its web site.
- Two state agencies reported that they did not do any promotion of carpet recycling in their state, and one state agency indicated that it provided promotion through conferences/seminars.

***Have any attempts been made to quantify the level of carpet recycling in your state/region? If so, can you either summarize the results or provide information about how to obtain these results.***

- Neither of the EPA regions indicated that they had made any attempts to quantify carpet recycling.
- None of the states indicated that any quantitative data had been collected on carpet recycling.

***Are you aware of any dedicated carpet collection efforts within your state/region (e.g. designated collection days for setting out used carpet)? If so, is there any data on the quantity of material collected and/or recycled?***

- Neither of the EPA regions indicated an awareness of designated carpet collection efforts.
- One state indicated an awareness of dedicated carpet collection or recycling efforts, but had no quantitative data.

***What efforts were made in 2004 to promote business development related to carpet recycling (e.g. grants, training, education, etc.)? Does this include efforts to promote small business development in this field?***

- The two EPA regions indicated that they did not make any efforts in 2004 to promote business development related to carpet recycling.
- One state indicated that it provided grants and "other" support for business development related to carpet recycling.

***Were any actions taken in 2004 to promote or facilitate waste-to-energy as an alternative to landfilling of carpet? If so, please describe.***

- The two EPA regions responded that no actions were taken in this regard.
- None of the states indicated that any actions were taken to promote waste-to-energy as a management method for used carpeting.

***Are there standards for recycled content of carpet procured by your agency? If so, do they include minimum post-consumer recycled content requirements?***

- Two EPA regions indicated that they have recycled content standards for purchase of carpet, with one of the two noting that it has a post-consumer content standard.
- Two states indicated that there are procurement requirements for purchase of carpet with recycled content.

**How much money (if any) did your agency spend in 2004 on promotion of carpet recycling?**

- The two EPA regions and two states indicated that no money was spent on promotion of carpet recycling.
- One state noted that it had provided a grant of \$100,000 related to carpet recycling.

***Does your agency receive inquiries regarding carpet recycling? If so, please characterize the nature of these inquiries and the type of response provided.***

- One EPA region indicated that inquiries were rare (characterized as several a year) and the other indicated that inquiries were occasional (characterized as about one per month).
- One state indicated no questions had been received, one state indicated that inquiries are rare and one indicated that inquiries are occasional.

***Please describe any other initiatives undertaken by your agency in 2003 to help promote carpet recycling.***

- One EPA region indicated that it is working to set up collection points for carpeting.
- The three states did not have other initiatives to describe.

## **Product and Market Development Activities**

Despite the shut down and closure of Polyamid 2000 in June of 2003, the total pounds of post consumer carpet diverted from landfills this year increased dramatically over 2003. It is a solid increase of 16+%. Coming off the problems we saw in 2003, this increase represents solid growth. Why, because we have learned a lot in the past three years. One thing we know for certain, this is not an easy challenge.

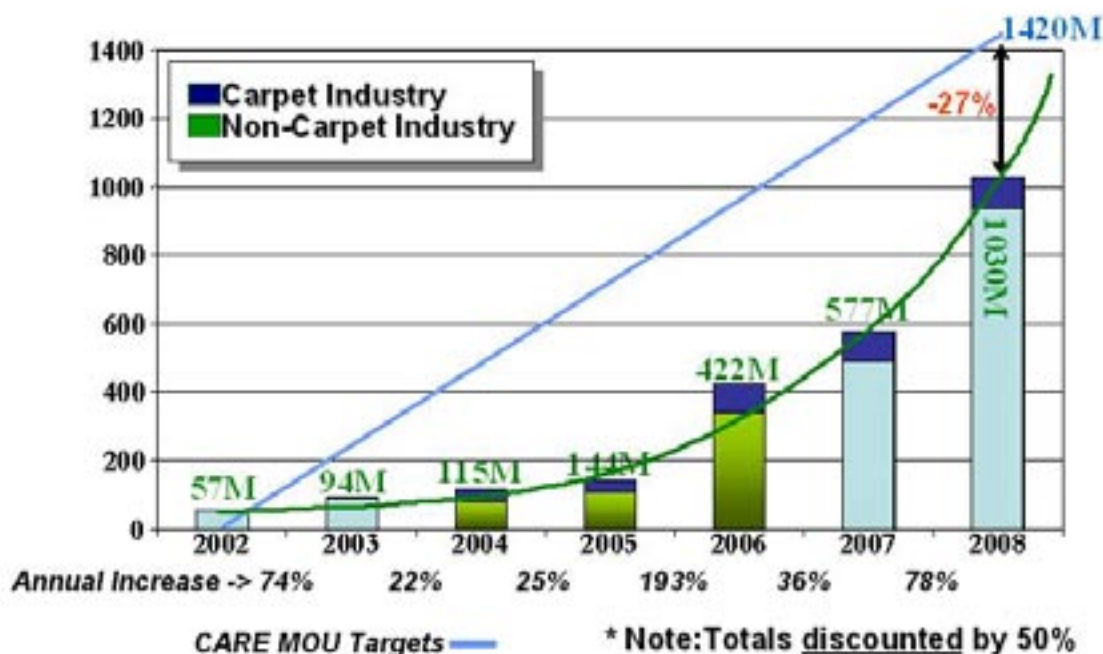
When one looks historically at the development of new technology and products, it is a well know phenomena that growth follows an S-curve trajectory, as opposed to a linear ramp up. We have all heard of hockey stick forecasts and know they never happen. While the interim goals of the MOU signed in January of 2002 were based on a linear ramp up, we now know this was unrealistic.

In order to examine the true potential for landfill diversion of post consumer carpet, we conducted an independent study with the help of Dr. Matthew Realff of The Georgia Institute of Technology. Operating under confidentiality agreements, Dr. Realff conducted a survey of all the major carpet industry companies to ascertain the potential for future diversion based on both public and proprietary programs under active development today. Industry members have made it clear, they will not discuss such proprietary programs for competitive reasons and this is reasonable in our opinion. At the same time industry players were being polled, we also contacted the entrepreneur community to solicit their thinking on future volumes.

Our approach to data collection took the form of "realistic forecasts" going forward from 2004 through 2008. We asked for conservative, expected and best case estimates. The diversion pathway results were broken down into four basic areas: carpet industry potential contributions, entrepreneur contribution potential,

use by cement kilns and power generation. A plot of the potential contribution for industry vs. non-industry potential diversion pounds looks like a classic S-curve for growth. The following diagram shows the results of this analysis after discounting the expected pounds reported by 50% to be conservative. This analysis was completed in the fall of 2004 prior to the latest survey results. The result of this year's data collection and analysis tracks extremely well with the analysis conducted by Dr. Matthew Realff. He predicted modest gains for 2004 and 2005 with the major gains starting in 2006. As you read further you will see rationale that supports this expectation.

**Figure 6**  
**Projected Diversion\* vs. CARE Goals**



The blue line on this graph shows the original linear ramp up targets for CARE. What is more striking is the projected intersection of the linear goal and the S-curve growth curve. The conclusion from this graph is that we should expect to achieve or exceed our goal by 2012. This is not an insignificant observation.

What are the probabilities of achieving this outcome? While none of us have a crystal ball, there are some factors that favor such a projection.

1. Crude oil prices are at historic levels. No one expects us to return to oil at \$25 a barrel. Recent forecasts peg top prices as high as \$107 per barrel. While not favorable for those of us buying gasoline for our vehicles, it definitely helps with the economics of recycling.

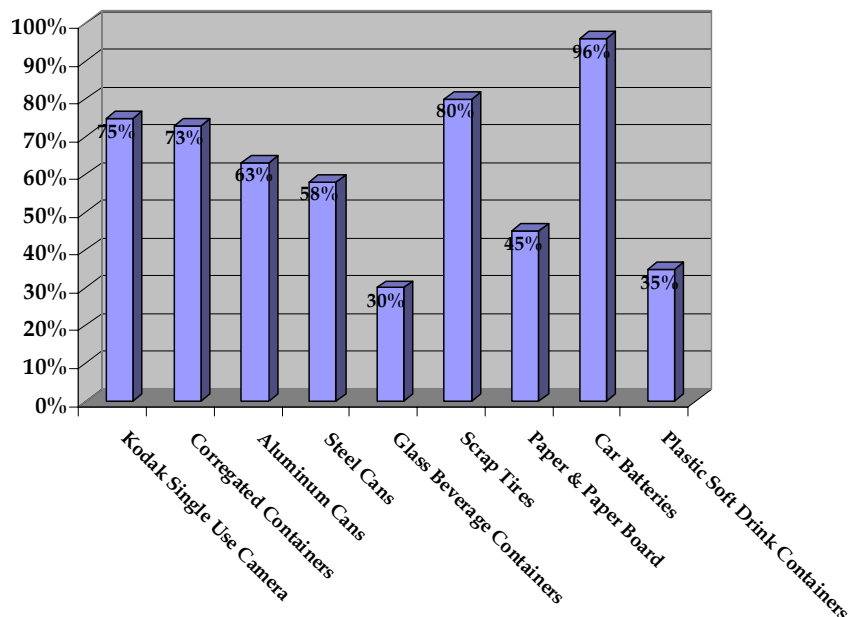
2. Post industrial sources of plastic materials, especially from carpet manufacturing, are decreasing. This means less of the cleaner, easier to handle PI stream available for recovery. These reductions are driven by good manufacturing practices, 6 Sigma programs, etc.
3. As a result of item 2, the supply/demand balance for PI materials has resulted in dramatic price increases for this material stream.
4. Asian manufacturers are vacuuming the United States for cheap thermoplastic raw materials. The result – increasing pressure on supply/demand resulting in escalating prices for PI materials.
5. China cannot build petrochemical plants fast enough to meet their increasing appetite for both energy and basic raw materials. The result is pricing pressure due to supply/demand.
6. Factors 1-5 are not expected to abate but rather increase pressure on raw material sources.

The result of this shifting dynamic scenario is recognition that old carpet is an abundant and potentially inexpensive source of key building blocks – primarily nylon and polypropylene. There has been a dramatic increase in interest by equipment vendors, manufacturers and recyclers in post consumer carpet. While no one can be certain, the next few years look very promising for major investment in new technologies for both the recovery and processing of post consumer carpet as well as new products which incorporate these materials.

CARE is in a unique position to dialog with key players both inside and outside the carpet industry. It is readily apparent, as a result of such conversations, that there are significant investments being made by many players in both the basic infrastructure of collection and processing as well as engineering technologies for the use of this raw material feed stream. As manufacturers become more confident in the reliability of a secure, consistent quality of supply, demand will grow dramatically in the next several years. This gives us great hope of climbing the S-curve.

We believe it is also important to put this effort into perspective by looking at other recycling initiatives. The following chart shows a variety of recycle programs for a wide array of materials. Most have been in place for many years and have only recently been able to achieve significant levels of recycle. Most have gone through cycles where recycle rates actually drop. Polyester bottles are one such example.

**Figure 7**  
**Benchmark Recycle Rates**



In summary, we know the single most important requirement for driving the diversion of post consumer carpet is the creation of demand for products that contain post consumer carpet as a key ingredient. The way to make this happen is to get our economics right. This is where CARE is spending a significant effort in terms of facilitating information exchange and developing economic models based on honest and frank dialog.

## CARE Accomplishments in 2004

All organizations go through cycles and 2004 was a year of growing pains for CARE. Issues of how to take CARE funding to the next level were discussed but no obvious path forward was realized. CARE will continue to operate at its current level of voluntary funding for the next year.

After two years of grants totaling almost \$200,000, it is not apparent that significant additional pounds of carpet have been diverted. We know at least one grant recipient is making excellent progress toward the development and use of technology for post consumer carpet. However, actual pounds of diversion are still a few years off.

Through the efforts of our Board Chairman, Frank Hurd, CARE secured a \$274,000 DOE grant to study the use of post consumer carpet as an alternate derived fuel in cement kilns. Preliminary work under the direction of Dr. Matthew Reaff of Georgia Tech. showed promise and a full-scale trial burn was made in the fall of 2004 at Lehigh Cement in Pennsylvania in collaboration with Paul Lemieux of EPA's Raleigh, NC research facility. The effort was facilitated by support from the American Society of Mechanical Engineers (ASME), Sean Ragiel of CarpetCycle which supplied the carpet and Republic Machines who supplied the chopping equipment.

CARE held a very productive annual meeting on Pensacola Beach, FL in May 2004. The keynote speaker was Paul Hawken. A number of states and the EPA were present along with entrepreneurs, equipment vendors, the carpet industry and the press. Speaker slides and information may be found on the CARE web site. CARE's Recycler of the Year Award went to Nylon Board Manufacturing located in Medford, MN and now known as NYCORE. CARE's Person of the Year was Matthew Ewadinger. Matt is Program manager for the North Carolina Recycling Business Assistance Center. Mr. Ewadinger serves as a member of CARE's Board of Directors and is cochair of the organization's Business Development Subcommittee.

The 2003 CARE Recycler of the Year award went to Nylon Board Manufacturing of Medford, MN. In 2004 NYCORE, INC. acquired substantially all the assets of Nylon Board Manufacturing and is planning an aggressive nationwide expansion in 2005.



Marcia Deegler describes purchasing programs for the state of Massachusetts at 2004 Annual meeting.



Matthew Ewadinger (center) receiving the 2003 CARE Person of the Year award from CARE Board Chairman Frank Hurd (left) and Robert Peoples, CARE Executive Director.

CARE also initiated a quarterly newsletter in the fall of 2004. The goal of this communication tool will be to share the latest development with all CARE stakeholders. If you would like to have your name added to the distribution list please contact CARE directly via the web site. Past editions are available on the web site as well.

Following the CARE Annual meeting, CARE hosted an invitation only entrepreneur forum in Orlando, FL in September, 2005. The purpose of the meeting was to connect entrepreneurs, discuss common barriers and develop suggests to over those barriers. The Southern Waste Information Exchange served as a generous sponsor for this meeting and helped enable participation by several of the entrepreneurs. Response was overwhelmingly positive and the entrepreneurial community has asked for another session in 2005.

CARE has on on-going search to look for large volume products that are capable of consuming significant quantities of carpet. Rail ties continue to garner our attention. The key stumbling block seems to be economics. Recently a new approach to composite rail ties has been developed which offers a way to bridge the economic gap. Active discussions are underway, an extruder has been ordered and hundreds of ties are being tested in the laboratory and in the field. We hope to have big news in the fourth quarter of 2005.

Conigliaro Industries located outside Boston, MA is developing a new product called Plas-Crete Wall Blocks. Each block measures 24"x24"x48" and weighs 1,850 lb. These blocks have the potential to contain a large quantity of undifferentiated post consumer carpet.

A number of efforts are underway to recover nylon polymer in a form that can be re-spun into carpet face fiber. Most of these efforts are proprietary programs. One such academic program is underway at Auburn University. Auburn is seeking a licensee (exclusive or non-exclusive) or development partner for an invention that separates nylon from post-industrial or post-consumer carpet waste and makes it available for recycling.



Conigliaro Plas-Crete Wall Blocks



In the process, the nylon is selectively dissolved into formic acid. The solvent and polymer solution is then mixed with a compressed anti-solvent (supercritical CO<sub>2</sub>) in which the polymer is insoluble. The nylon precipitates from the solution and can then be recovered. Both the solvent and anti-solvent are recycled in a continuous process. The technology is protected under United States Patent Number 5,994,417.

The advantages of this new technology include the following attributes:

- Recovered nylon nearly identical to virgin nylon
- Economic analysis indicates that an 18 MM lb/yr plant could operate economically with a payback of less than three years
- Use of formic acid and CO<sub>2</sub> eliminate the need for more hazardous solvents
- Solvents are recycled in a closed-loop process, reducing waste and cost
- The process is highly scalable

A novel retainer wall system has been developed using old carpet by Vortex Composites out of Chicago. Designed to look like brick, different colors and styles are available. You can now have the professional look of a high-end brick, stone or concrete retaining wall or raised planting wall. These materials are highly durable and 40% lighter than concrete. The company has been in development for some time but the product is commercially available and major expansion plans are underway.



SmartTie<sup>TM</sup> Wall System

## Industry Products and Programs

**C&A / Tandus** beginning in the early ninety's, C&A, a Tandus Group company, developed patented technology to "close-loop" recycle post consumer carpet and manufacturing waste into recycled content backing for new floor coverings. The company's ER3 tile and ER3 six-foot cushion products contain a minimum of 31% overall recycled content and are 100% recyclable today. ER3 secondary backing is made from post consumer vinyl carpet and manufacturing waste. In 2004, C&A introduced the ethos<sup>TM</sup> cushion 100 product line. The overall recycled content in the product line ranges from 30 to 52% and includes a minimum 30% post consumer content in every style. The ethos secondary backing, the first of its kind, is made from plastic film recovered from discarded auto windshields and safety glass. ethos<sup>TM</sup> is also 100% recyclable back into carpet using C&A's existing recycling processes and facilities.

### **Honeywell** - 6ix Again® Carpet Recycling Programs

Zeftron® was the first commercial fiber brand to launch a nationwide carpet recycling program for commercial carpets. This program, known as 6ix Again®, was introduced in 1994 and based on a patented closed-loop carpet recycling technology. Complimenting our commitment to Sustainable Development, 6ix Again® was specifically intended to offer end-users of branded nylon 6 products an environmentally responsible alternative to landfill disposal of used carpets.



Today, the 6ix Again® program has evolved to meet the increasingly challenging demands of environmentally sensitive requirements that include not only the products we manufacture but also those manufactured by others. Detailed below are the different opportunities we provide not only for our products but also for those of our competitors.

- Nylon to nylon closed-loop recycling
- Recovered face fiber is guaranteed not to be landfilled or incinerated
- No recycling fee
- Available through all flooring contractors
- Environmental Achievement certificate
- All fiber types and backing systems are eligible
- Recovered face fiber is guaranteed not to be landfilled
- We assume responsibility to locate qualified recycling center and coordinate all activities

The 6ix Again® Service Center provides participant assistance to facilitate environmentally responsible disposal.

**INVISTA™**, makers of Antron® carpet fiber, opened their reclamation center for business in 1991. Since then, the INVISTA Reclamation Program has diverted more than 100 million pounds of used carpet resulting in more than 400,000 cubic yards of conserved landfill space. The INVISTA Reclamation Program is certified by an independent third party, Scientific Certification Systems (SCS) as a carpet reclamation and processing facility.

INVISTA's nationwide carpet reclamation program is now open to all dealers and end-users. The facility, based in Calhoun, Ga., will provide containers for collection and trailers for transport, if needed, or customers can deliver post-consumer carpet directly to the facility.

End-users, architects, designers and commercial dealers have told us they want to recycle, so Invista has made their program more flexible and less restrictive in hopes that more people can take advantage of this environmentally-responsible option. Dealers and end-users interested in recycling should contact Invista fiber consultants for more information.

The program will collect and reclaim any used carpet and installation scraps- ALL fiber types, ALL carpet construction types, from ANY manufacturer. And NO carpet will be sent to the landfill. The INVISTA Reclamation Program has the unique capability to track carpet throughout the process, and will provide, upon request, chain of custody documentation. Recycled material from the program may be used in new carpet, carpet cushion, filtration devices, automotive parts, packaging materials and furniture.

To obtain CSI-formatted reclamation specifications or to get started on reclaiming used carpet from your project, go on-line to [antron.invista.com](http://antron.invista.com), or call 1-877-5-ANTRON.

Antron® carpet fibers are third-party certified by Scientific Certification Systems as Environmentally Preferable Products (EPP). Environmentally Preferable Products are defined by Executive Order 13101 as products that have a lesser or reduced effect on human health and the environment when compared to other products that serve the same purpose.

**Interface** diverted 17.2 million pounds of material from landfills in 2004 through its ReEntry® carpet reclamation program, a 34.5% increase from 2003. Seventy-two percent of the material diverted was post consumer and 28% was post industrial.

ReEntry® uses three basic landfill diversion options, recycle, repurpose (reuse), and energy capture and conversion. Interface recycled 60% of the total pounds reclaimed in 2004. We repurposed 3% percent and 37% was used for energy capture and conversion. . Today, Interface is reclaiming vinyl backed tile products as feedstock for the manufacture of new GlasBac® RE vinyl backed tile products. A number of GlasBac® RE products have received third party environmentally preferable product (EPP) certification from Scientific Certification Systems, and those same products have also received third party total recycled content certification from SCS

**J&J / Invision** is committed to environmental responsibility. We work continually to reduce our waste, to reuse whatever possible and to recycle at every opportunity. EnAct®, our environmental action initiative, is not a marketing program; it is a philosophy that pervades every aspect of our company. Through our EnAct® Program we strive to find the highest value end-use for your reclaimed carpet, and guarantee that it won't end up in a landfill. We will even coordinate pick-up and transportation to the recycling center.

Encore® SD Ultima®, the nylon-6 fiber that we extrude at J&J / Invision, contains a minimum of 25% recycled nylon content. Over half of our total carpet styles are made from this solution dyed nylon which qualifies our products for LEED-NC Materials & Resources Credit 4.1. Invision's Karakul contains a total of 44% recycled content. J&J / Invision has the only SBR latex backing that contains recycled content. Carpets made from Encore® SD Ultima® and which have SBR latex backing, are recyclable in the Honeywell 6ix Again® Program.

J&J / Invision participates in Solutia's Partners for Renewal® recycling program and the Invista Carpet Reclamation Program. We are also working quietly behind the scenes to identify and enable other recycle opportunities that could result in post-consumer carpet being incorporated into cement, decking boards, marine pilings or plastic "plywood." J&J / Invision also offers performance backings that contain post-industrial, post-consumer, and rapidly renewable content.

**Mannington** has provided recycled content in their carpet and VCT products for several years. Efforts continue to increase those levels while being fully committed to assuring optimum performance and durability. More recently, Mannington introduced Artcraft, a unique modular carpet product that has a fiber face made entirely of post-production yarns that previously were down-cycled. Now, combining recycling technologies from both soft and hard surface operations, Mannington has released Relay, the flooring industry's very first hard surface sheet product made of 40% recycled content, and that recycled material is ground carpet. Mannington offers two different carpet take-back recycling programs for customers attempting to keep carpet out of landfills.

**Milliken** – Reclamation: With an environmental policy in effect for more than four decades Milliken Carpet initiated regenerative efforts to ensure zero waste and no carpet or components to landfill in the early 1990s. Since 1999 Milliken has achieved Zero Waste to Landfill. The No Carpet to Landfill Pledge is now standard.

All Milliken carpet products are 100% recyclable and old carpet is evaluated at the end of its useful life to determine the highest environmental value recovery possible. Rejuvenating modular carpet through the unique Earth Square® process is the first and highest level of consideration, adding another life cycle with cleaning and updated design. A partnership for donations with Reuse Development Organization (ReDO), a national non-profit promoting reuse on every level, offers another alternative to landfill.

When renewal or reuse options are exhausted, closed-loop recycling that recycles components into new carpet is employed as the third line of response.

Products: Milliken Carpet seeks high performance products with a negative environmental footprint. Comfort Plus cushion backing extends carpet life up to 50% by absorbing wear, protecting the carpet face and ensuring better appearance and longer performance. It reduces fatigue and improves thermal insulation, cutting energy costs. All Comfort Plus backed modular carpet is available with ES (engineered for sustainability) backing, which contains up to 35% recycled content based on total product weight. Recycled content is 89% Post-Industrial, 10% Post-Consumer, and 1% rapidly renewable resources.

**Mohawk Industries** is actively engaged in a variety of reclamation initiatives from post industrial to post consumer reclamation. In Mohawk's quest to achieve sustainable practices, one of the key elements is the reclamation of every waste stream that is possible to reclaim. The company employs a variety of technologies to reclaim millions of pounds of internal and external post industrial materials in order to lessen the landfill burden of the United States.

Mohawk Industries is developing technologies for future applications in order to reclaim larger percentages of waste streams as well as divert those waste streams to higher value products. One such product is *Colorstrand Infinity Nylon* which is used in the commercial sector and is extruded using 25% Post Consumer and 25% Post Industrial content. The company's Summerville, Georgia facility recycles billions of plastic soda bottles into 100% Post Consumer carpet yarns for the residential market. Mohawk also reclaims internal post industrial streams of nylon and extrudes them into new solution dyed nylon fibers called Colorstrand. In an effort to recycle other waste streams, the company has developed proprietary processes to manufacture valuable products that can be reclaimed in a closed loop process.

**Royalty**, a west coast operation, is currently reclaiming 200,000 gallons of water per day for use in dyeing operations. They have installed energy efficient lighting in their dyehouse and finishing plant which saves 150 kwh/hour. Royalty recycles 100% of its hard and soft waste equaling 524 tons per year of hard carpet waste and 460 tons per year of soft carpet waste.

**Shaw Industries** continues to expand its sustainable products line. EcoWorx® is a 100% non-PVC sustainable backing system. EcoWorx® has won the EPA Presidential Green Chemistry Award as an Environmentally Preferable Product. EcoSolution Q® is made from 25% reclaimed nylon 6 fiber and, at the end of its useful life, can be recycled back into fiber over and over again. That's the essence of cradle-to-cradle design. Now, the combination of EcoSolution Q® and EcoWorx® offers a 100% recyclable carpet; backing to backing and fiber to fiber. A system designed from the ground up to be sustainable.

**Solutia** supplies Ultron® Renew fiber in SDN containing an SCS certified minimum of 80% post-industrial content. Ultron® Renew is also available in staple form with up to 100% post industrial content. In addition,

Solutia Ultron® was recently certified by MBDC as a Cradle to Cradle certified material after a lengthy chemical analysis of all of the inputs. Solutia also sponsors their Partners for Renewal program to foster collaboration with entrepreneurs to help facilitate their success.

**Synthetic Industries Corporation** has been a proud member of CARE for the last two years. The company understands the importance of an industry wide effort to recycle, reduce waste, and decrease tonnage to landfills.

With a 99% efficiency rate in raw material usage, SI has made great strides in its goal of reducing waste. Scrap that is produced during the manufacturing process is repelletized into a usable product by a state-of-the-art Erema manufacturing line. Most of SI's repelletized scrap is consumed in house and a small portion is sold to other businesses for their processes.

Beginning in 2002, SI completely revamped its manufacturing floor to become more efficient by reducing waste in every aspect of operation. By implementing a philosophy called Lean Manufacturing, over the last 36 months, SI has generated 50% less process waste than before. The areas of targeted waste reduction are as follows: overproduction, excess inventory, defects, over-processing, unnecessary motion, waiting time, transportation, and human injuries.

The International Standards Organization's coveted ISO 14001 designation is the seal for environmental responsibility. Since 1997, when SI was the first manufacturing facility in North America to achieve ISO 14001 certification, the continual process of updating and revising environmentally sound manufacturing practices has enabled the company to renew its certification every year.

Apart from its environmentally conscious manufacturing practices, SI and Shaw Industries have recently co-developed Ecologix™, a 90% post consumer recycled material product. This high performance carpet cushioning system represents just one of the company's new products containing post consumer recycled material. The research and development team at SI spends countless hours finding ways to produce new products that not only contain recycled material but also outperform existing products on the market. Ecologix™ is a perfect example of this effort.

## CONCLUSION

The lessons of the past three years are now becoming apparent and more importantly, understood. Despite a significant amount of good work and many accomplishments, including a 15 percent increase in the documented level of diversion from landfill from 2003 to 2004, CARE did not hit our target. However, based on the analysis by Dr. Realff of future diversion potential by both the carpet industry and entrepreneurial community, it appears we have a viable path forward. While details are held close for competitive reasons, the identified routes will not only allow us to grow this new industry but at the same time portends a reasonable chance of hitting our targets as the growth curve turns upward in 2006 and 2007.

Clearly this is a complex mission and it will take the collective wisdom and commitment of all those who have supported CARE in the past. A hearty thanks to all those who serve and support CARE and handle post consumer carpet!

**CARE SPONSORSHIP PROGRAM**

CARE successfully implemented the sponsorship program levels of participation as follows:

**Table 6**  
**CARE Sponsorship Participation**

Sponsorship	Contribution Amount	Sponsoring Companies
Sustainability Leadership	200% of the Corporate Sponsor level	<ul style="list-style-type: none"> <li>Interface Flooring Systems</li> </ul>
Green	150% of the Corporate Sponsor level	<ul style="list-style-type: none"> <li>Honeywell Nylon</li> <li>J&amp;J Commercial</li> </ul>
Corporate	Companies >\$3B in carpet sales \$30,000 Companies \$1B-\$3B in carpet sales \$20,000 Companies \$250-\$1B in carpet sales \$10,000 Companies with <\$250M in carpet sales \$5,000 State Government \$2,000 Nongovernment organizations (NGOs) \$1,000 Equipment Suppliers \$15,000 Materials Suppliers \$10,000 Entrepreneurs in kind All others \$5,000	<ul style="list-style-type: none"> <li>Antron® Carpet Fiber</li> <li>Cycle-Tex</li> <li>ERCS</li> <li>LA Fibers</li> <li>Mannington</li> <li>Mohawk</li> <li>Propex</li> <li>Royalty</li> <li>Shaw</li> <li>SI Flooring Systems</li> <li>Solutia</li> <li>SWIX</li> </ul>

## APPENDIX 1

### LISTING OF COMPANIES INCLUDED IN SURVEY

NOTE: Some companies had multiple facilities and contacts in the database of contacts used for the survey, however, for simplicity each company is only listed once in the following list.

1st Choice Carpets International	Brumlow Mills, Inc.
A & D Carpets	Buckner Industries, Inc.
A. West and Company	Bulloch Candler Service Center
ACF	Burlington House Area Rugs
Admiralty Mills Inc.	Burlington Industries, Inc.
ADVAC	Burtco Enterprises Inc
Advanced Textile Recycling	Burtco Tufting
Advance Tufting	C'Board USA, Inc
American National Carpet Mills, Inc.	C & E Contract Tufting
American Recycling Co., Inc.	C & L Industries, Inc.
American Rug Craftsmen, Inc.	Camelot Carpet Mills, Inc.
American Tufted Carpet	Capel, Inc.
Apache Mills, Inc.	Caravelle Contract Tufters
Artisans, Inc.	Carousel Carpet Mills, Inc.
Aston Mills, Inc.	Carpet Crafts, Inc.
Astro Putt, Inc.	Carpet Cushion Council
AstroTurf® Industries, Inc.	Carpet Cycle LLC
Atlas Carpet Mills Inc	Carpet Solutions
Auto Custom Carpet, Inc.	Carpeton Mills, Inc.
Avanti Corporation	Carriage Industries, Inc.
B & L Tufters	Carroll Mills Inc.
B & V Sales	Carter Carpets, Inc.
Badger Industries, Inc.	Cascade Carpet Mills, Inc.
Barrett Carpet Mills	Catalina Carpet Mills Inc
BASF	Catalina Rug Company
Beaulieu Group LLC	CDC Commercial Carpet, Inc.
Beaulieu of America	Centennial Carpet Mills
Bennytex Carpet Mills, Inc.	Challenger Carpet Mills
Bentley Mills, Interface Inc.	Challenger Industries, Inc.
BFI	Challenger Manufacturing
Bloomsburg Carpet Industries, Inc.	Champion Polymer
Blue Ridge Carpet	Cherokee Carpet Industries
Blue Ridge Commercial Carpet	Chroma Systems
Blue Ridge Recycling	Clearwater Carpet Mills, Inc.
bp Amoco Fabrics & Fibers	CNP
BRIGHTEX USA INC	Collins & Aikman Floorcovering, Inc.
Brintons US Axminster In	Colonial Braided Rug Company

Colonial Carpet Mills, Inc.  
Colonial Mills, Inc.  
Colony Crafts, Inc.  
Columbia Recycling Corp.  
Commercial Carpet Concepts  
Concord/Aldon Industries, Inc.  
Contract Color Works, Inc.  
Contrax, Ltd.  
Convanta Secure Services  
Couristan, Inc.  
Creative Accents  
Creative Carpets Inc  
Creston Carpet Mills LLC  
Creston Carpet Mills, Inc.  
Cross Plains Tufters  
Custom Graphics  
Cycle-Tex Inc.  
Da-Co Industries, Inc.  
Dalton Carpet & Cushion, Inc.  
Daltonian Flooring Inc  
DC Tufters  
Dellinger, Inc.  
Dixie Group, The  
Domestic & Export Carpet, Inc.  
Double S Carpet, Inc.  
DOW Chemical  
E & S Carpets  
Easton Carpet Mills  
Eddi Wowler  
Edward Fields Inc  
Embassy Industries, Inc.  
Emerald Carpets, Inc.  
EMM Carpet Tufting  
Environmental Recycling Alt.  
EnvironX  
EPA-States  
ERCS  
Evergreen Nylon Recycling  
Excel Carpet Mills, Inc.  
Exclusive Industries  
F. Schumacher & Co.  
Fabrica International  
Fantastic Tufters, Inc.  
Fibertex Carpets  
Fibre Processing Co.

FiberVisions Inc.  
Fieldcrest Cannon, Pillowtex  
Fieldturf & Carpets, Inc.  
Filipe Braided Rugs  
Flagship Carpets, Inc.  
Floor Visions, Inc.  
Florentine Carpets  
Foamex International, Inc.  
Fortune Contract Inc  
G & F Carpet Mill  
Georgia Composite  
Georgia Tufters, L.L.C.  
Glen Eden Wool Carpets, Inc.  
Glenoit Mills, Inc.  
Glenwood Tufters, Inc.  
Gold Label Carpet Mills  
Golden Star, Inc.  
Graphic Tufting Center, Inc.  
Graphictec, Inc.  
Grass-Tex, Inc.  
Gulistan Carpet, Inc.  
H & B Tufters  
Hagaman Carpet Industries, Inc.  
Hamilton Carpet Industries  
Hammontree Tufters  
Healthier Choice Carpet and Cushions, Inc.  
Hokanson, Inc  
Holly Craft Carpets, Inc.  
Hollytex Carpet Mills, Inc.  
Honeywell  
Ideal Tufters  
Impact Carpets, Inc.  
Interface Americas Floorcoverings Products Group  
Interface, Inc.  
Invista Reclamation (Dupont)  
J & B Tufting  
J & J Industries, Inc.  
J & J/Invision  
J. L. Benson Company  
JaSue Carpet  
JCH International  
JMG Carpets, Inc.  
Jostes Carpet, Inc.  
Joy Carpets, Inc.  
JRC Industries



K & J Carpet  
K & K Tufters  
Karastan  
Lacey Mills Inc.  
Lacey-Champion Carpets  
Lady Madison Industries, Inc.  
Langhorne Carpet Company  
Lanier Carpets  
LaSan Tufting, Inc.  
Lear Corporation  
Lees Carpets/Burlington Ind. Inc.  
Len-Dal Carpets  
Len-Dal Carpets, Inc.  
Lexmark Carpet Mills, Inc.  
Log Cabin Company Inc.  
Los Angeles Fibers  
Lowe's Carpet Corporation  
Ludlow Composites Corporation  
Lyle Industries, Inc.  
Madison Industries, Inc.  
Magee Reiter Automotive Systems  
Mainline Exhibitor Carpet  
Manhattan Carpets, Inc.  
Mannington Commercial Carpets, Inc.  
Mannington Mills, Inc.  
Maples Industries, Inc.  
Marquis Industries, Inc.  
Mar-Thac Custom Carpets  
Martin Color-Fi, Inc.  
Mary Ann Industries  
Masland Industries  
Master Touch Carpets, Inc.  
Mastercraft Carpet Mills, Inc.  
Masterweave Commercial Carpet  
Matrix Tufters  
Mats, Inc.  
Mattel Carpet  
Merida Meridian Inc  
Merit Hospitality  
Michaelian & Kohlberg, Inc.  
Milliken & Company  
Modern Carpet Industries  
Mohawk Industries, Inc.  
Monticello Carpet Mills  
Monticello Carpet Mills

Mountain Rug Mills, Inc.  
Mountville Mills Inc.  
New River Artisans  
North American Carpet Mills  
North Georgia Textile Recycling  
Northwest Carpets, Inc.  
NyloBoard  
Nylon Board -MN  
Options  
Options Tai Ping Carpets Inc  
Orian Rugs, Inc.  
Oriental Weavers of America  
P & P Tufters  
PacifiCrest Mills  
Paragon Mills, Inc. dba Beacon Carpets  
Passport Carpets, Inc.  
Pavilion Industries, Inc.  
Peeler Rug & Printing  
Pike Companies  
Pilgrim House Rugs  
Pillowtex Corporation  
Pinion Rug Company  
Playfield International, Inc.  
Polytec  
Preferred Tufting, Inc.  
Prestige Mills, Inc.  
Product Concepts Residential  
Product Concepts Residential, LLC  
Professional Contract Sales, Inc.  
Proffitt Textile Company, Inc.  
ProGroup, Inc.  
Pyramid Industries, Inc.  
Quality Mat  
R & N Industries  
R & R Textile  
R. D. Stallion, Inc.  
Rainbow Carpet Mills, Inc.  
Rainbow Rug, Inc.  
Recycled Materials, Inc.  
Redrock Custom Carpets  
Regal Carpets, Inc.  
Regal Rugs, Inc.  
Remington Industries, Inc.  
Rhody Rugs  
River Associates, L.L.C.

Robin Rug, Inc.  
Rodeo Carpet Mills, Inc.  
Rosewood Rug Inc.  
Royalty Carpet Mills Inc  
Rugmaker/D.R.C. Company  
S & S Mills, Inc.  
S.E.T. Enterprises, Inc.  
SaveWood, LLC  
Savnik & Company  
SB Latex Council  
Scott Carpet Mills  
Selectech Inc.  
Shaheen Carpet Mills, Inc.  
Shaw Industries, Inc. Plant 20  
Sherwin-Williams Company  
Signal Textiles, Inc.  
Solutia  
Southeast Whitfield Carpet  
Southern Carpet Mills  
Southwest Recreational Industries  
Spinning Wheel Rugs  
Springs Industries, Inc.  
Springs Regal Inc.-Ellijay  
Stanton/Royal Dutch Carpet Corp.  
Star International, Ltd.  
Stevenson Carpets, Inc.  
Structured Backing, Inc.  
Sunrise Studio

Superior Manufacturing Group  
Supreme Carpet, Inc.  
Sutherlin Carpet Mills  
Syntec Industries, Inc.  
Tai Ping Carpets and Rugs  
Talisman Mills  
Textile Concepts, Inc.  
Textraw Synthetic Pine Straw  
Thorndike Mills, Inc.  
TieTek  
TKO Polymers  
Tribute Carpets  
Troy Mills, Inc.  
Tufted Graphics, Inc.  
U. S. Axminster, Inc.  
United Technical Products, Inc.  
USA Berbers  
Value Carpets, Inc.  
Variations Carpet Mills  
Varsity Rug Co. Inc.  
Vogue Enterprises, Inc.  
W & H Mfg., dba Preferred Carpets, Ltd.  
Waste Management  
Weavetex Mills, Inc.  
Weave-Tuft Carpet Corp.  
Wellman, Inc.  
Woolshire Carpet Mills, Inc.  
Worldwide Enterprises